

Round to 3 decimal places. Show all work.  
Multiple Choice (3 pts. each)

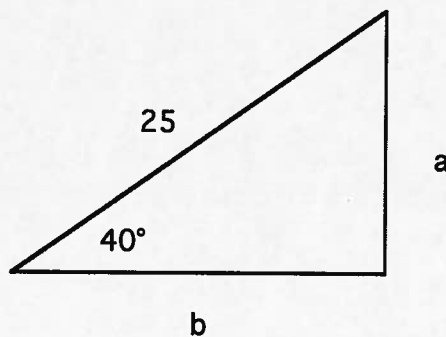
1.  $\csc\left(\cos^{-1}\frac{\sqrt{5}}{5}\right) =$

- a. 2.15    **b.** 1.12    c. 0.89    d. 0.98    e. 1.10

2. Suppose  $\vec{v} = 7\vec{i} - \sqrt{6}\vec{j}$ . Find the unit vector in the direction of  $\vec{v}$ .

- a.**  $\frac{7\sqrt{53}}{53}\vec{i} - \frac{\sqrt{318}}{53}\vec{j}$     b.  $\vec{v} = 7\vec{i} - \sqrt{6}\vec{j}$     c.  $\vec{v} = \frac{7}{\sqrt{6}}\vec{i} - \vec{j}$   
d.  $\vec{v} = \vec{i} - \frac{\sqrt{6}}{7}\vec{j}$     e.  $\frac{\sqrt{301}}{43}\vec{i} - \frac{6\sqrt{43}}{43}\vec{j}$

3. In the triangle shown, which of the following best approximates  $a$ ?



- a.** 16.07    b. 19.15    c. 20.98  
d. 32.64    e. 38.89

4. If  $f(x,y) = \tan x - \tan y$  and  $g(x,y) = 1 + \tan x \cdot \tan y$ , then, in radians,  $\frac{f(1,2)}{g(1,2)} =$

- a. 0                      b. -0.16                      c. 1.58  
d. 0.15                      e. -1.56

1.  $(5, -7)$  is on the terminal side of  $A$ . Find the six **exact** trig values:

$\sin A = -\frac{7}{\sqrt{74}}$        $\text{csc } A = -\frac{\sqrt{74}}{7}$   
 $\cos A = \frac{5}{\sqrt{74}}$        $\sec A = \frac{\sqrt{74}}{5}$   
 $\tan A = -\frac{7}{5}$        $\cot A = -\frac{5}{7}$

2. If  $\csc B = \frac{13}{5}$  in QII, find the other five **exact** trig values:

$\sin B = \frac{5}{13}$        $\csc B = \frac{13}{5}$   
 $\cos B = -\frac{12}{13}$        $\sec B = -\frac{13}{12}$   
 $\tan B = -\frac{5}{12}$        $\cot B = -\frac{12}{5}$

3. What are the approximate values, in degrees of  $A$  and  $B$  (from #1 and #2)?

$A = \underline{-54.482 \pm 360.7}$

$B = \underline{157.380 \pm 360.7}$

4. (a) Find the approximate values of:

$$\tan 42 = 2.291$$

$$\sin 42^\circ = .669$$

$$\csc 42 = -1.091$$

(b) Find the approximate values (in degrees) of:

$$\sin^{-1}(-.639) = \begin{cases} -39.717 \pm 360n \\ 219.717 \pm 360n \end{cases}$$

$$\sec^{-1}(3.72) = \begin{cases} \pm 74.406 \pm 360n \end{cases}$$

$$\tan^{-1}(1.43) = \begin{cases} 55.035 \pm 360n \\ 235.035 \pm 360n \end{cases}$$

$$\csc^{-1}(-.362) = \begin{cases} \text{NO SOLUTION} \end{cases}$$

5. A boat sails 60 mph at a bearing of  $200^\circ$ . The current flows 9 mph at  $112^\circ$ . Find the magnitude and bearing of the resultant vector.

$$-59.753 \vec{i} + -12.177 \vec{j}$$

$$|\vec{r}| = \sqrt{(-59.753)^2 + (-12.177)^2} = 60.981$$

$$\theta = -\cos^{-1}\left(\frac{-59.753}{60.981}\right) = -168.482^\circ$$

6. Identify the quadrant and reference angle of:

(a)  $985^\circ$

III  $85^\circ$

(b)  $-713^\circ$

I  $7^\circ$

(c)  $-1731^\circ$

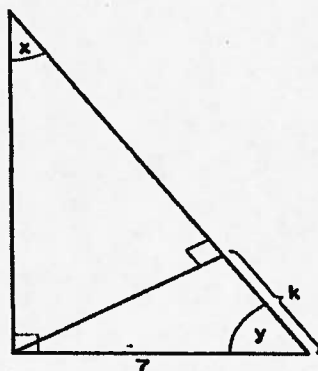
~~II~~ I  $79^\circ$

(d)  $893^\circ$

II  $7^\circ$

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5. In the figure below,  $k =$



$$\frac{k}{7} = \cos y$$

- a.  $7 \cos y$    b.  $7 \cos x$    c.  $7 \sin y$    d.  $\frac{7}{\sin x}$    e.  $\frac{7}{\cos y}$

6. An incline makes an angle of  $45^\circ$  with level ground. How many feet up the incline must one go in order to rise 12 feet above the ground?

- a.  $\frac{\sqrt{2}}{12}$    b.  $\frac{12}{\sqrt{2}}$    c. 12   d.  $12\sqrt{2}$    e. 24

7. What is the measure of an angle whose sine is twice the sine of  $30^\circ$ ?  $\sin 30 = \frac{1}{2}$

- a.  $30^\circ$    b.  $60^\circ$    c.  $90^\circ$    d.  $120^\circ$    e. No such angle

$$\sin \theta = 1$$

$$\theta = 90^\circ$$

7. Find the exact value of the following:

(a)  $\sec \frac{4\pi}{3} + \tan \frac{5\pi}{6}$

$$\left(-\frac{2}{\sqrt{3}}\right) + \frac{-1}{\sqrt{3}} = \frac{-3}{\sqrt{3}} = -\sqrt{3}$$

(b)  $\sin \frac{7\pi}{4} \cos \frac{3\pi}{4} + \csc \frac{\pi}{2} \cot \frac{3\pi}{2}$

$$\left(-\frac{1}{\sqrt{2}}\right) \left(\frac{-1}{\sqrt{2}}\right) + 1(0) = \frac{1}{2} + 0 = \frac{1}{2}$$